Input equipment: Coding & keyboard design

Moderators: E. R. Lannon, A. H. Phillips & J. L. Dolby

The computer keyboard: R. D. Kodis

Mr Cowan: How does hyphenation actually take place?

Mr Kodis: Hyphenation is done by the operator with a display by the computer. The operator must make the decision on hyphenation. Most of the lines will be broken by the machine and the operator will simply go on typing, with the machine adding the control codes and so forth, whether they are at the beginning or end of the line. If the operator ignores this, and has a line ending with a large word, with very few inter-word spaces, the line will not justify the inter-words, and a tight line will not go out. But in the normal operation, when the operator is hitting the copy, she sees these lines go on, and realising the line will not go on operating with this type of line deficit, she hits the key. We have made tests, and we have found very little reduction in speed due to the operator having to hyphenate. First, with the hard copy the operator knows exactly where she is and secondly the lights tell her where she is. Some people say that hyphenation is a big drain on keyboard time. Our experience is that it is not.

Mr Whalley: Is it possible to use the hard copy as a proof and then do a correction tape? Facilities exist for an operator to make corrections she is aware of, but what about the mistakes she may not be aware of?

Mr Kodis: After the line is justified and sent out by the electronics to the punch, it is no longer accessible to the operator at that time. If she then detects an error, she can mark it on the hard copy so that it does not have to be found by someone else. Again, knowing the errors are there is half the battle.

I was going to go into some of the other things we were doing, but we do not have time. One of them is the merging of the tape and man. We have a model of a machine, which is not automatic, whereby we can put back a tape, and merge anything from the old tape in with the new copy, and by deletion and addition put the two together at relatively high speed. But one cannot go back to that tape with this machine.

A keyboard perforator for the preparation of justified punched tape: W. Hartmann

Mr Airey: Have you experienced any problem with editorial staff using a keyboard punch tape? By that I mean non-printers.

Mr Hartmann: Up to now, we have trained fifty people from editorial and publishing houses. They are not editors, but typists. There have been no difficulties in training them, and the results have been good. The machine is designed in such a way that it is easy for people who are not experienced in the graphic arts and the special requirements of casting or photo typesetting to operate the perforators.

Mr Rush: What is the journalists' position, are they malleable and willing to operate the keyboards?

Mr Wadewitz: A journalist would never operate the keyboard. Only office staff from the editorial or publishing house, typists, and such staff, operate the Tastomat.

TTS coding—an analysis: A. H. Phillips

Mr Stephens: I have worked with equipment with about 30 different codes with five levels. In fact, the holes were the opposite way round. That meant it was not possible to put tape in the wrong way round, because the peg struck upon the solid part of the paper. With photo-electric readers, it does not matter which way round it is put, or where the sprocket hole is, because there is no guard on this.

Mr Phillips: I have tried a TTS tape on a Facit reader, which will not read TTS tape, although it will read tape having special holes because the hole is not in the right place to trigger the things in the first place.

Mr Stephens: Elliotts had the same trouble with a photo-electric reader. They had to modify their readers.

Mr Phillips: The hole is still in the wrong place in relation to the reference edge of the tape, and it will not even pick up the feed hole. This can be surmounted, but one cannot get over the fact that it is not in the same position *there* on the Facit readers, which I consider otherwise good readers, though expensive.

The Moderator: If the guides on the reader are changed, would that take care of this problem of reference?

Mr Phillips: Perhaps, if the guidelines were changed, and it can be accepted to have the hole being in the wrong place. One cannot expect the reader to do this.

Mr Grimmond: There are two quite distinct problems. The advance sprocket hole is simply a matter of adjusting a delay, because the advance sprocket hole is used for stroking. If delay

is put in, that takes care of that problem. The real problem with the TTS tape is that the channels are not in a standard position from the edge, and there is the problem of guiding the tape through. The only successful attempt that I have seen, to read both on one device, is in fact the RCA adaptation, which guides from the sprocket hole rather than from the edge of the tape. If anybody else knows of any other reader which will read TTS and standard tape, I should like to hear about it.

Mr Stephens: The one on the 713 will do both.

Mr Jolliffe: If at any time I required a code for driving a printing device of some sort, I would begin wording into this code from some other code which was more convenient in relation to what I was doing. For example, so far as we are concerned, any alphabetical sorting that has to take place is done without distinction between upper and lower case.

Mr Phillips: That is a bad system.

Mr Jolliffe: It may well be, but that means that we would want to operate with the upper case indicator at the least significant end rather than the most significant end. So that we would be working, for sorting purposes, with one set of codes, knowing we have to change anyway. How true is this going to be for other systems where input and processing might conceivably require codes different from the output code?

Mr Phillips: Mr Jolliffe has a problem the size of which no one else has to face. Perhaps nobody wants this solution at all. But the factor governing whether they want it or not will not be related to the processing of tape in the computer of a sufficient size to sort any code into any other code, and to allocate bits instead of shifts, and do all the things that can be done on the normal routines. It will only be used if linecasters are used by book printers who want small caps in the existing restrictions of the linecaster, which would mean one would have to double distribute. They want the small caps in the machine and want the simple way of getting this in the perforator, and they are using the ISO code because this is the next stage up from TTS.

If they are using the ISO code, there is some assistance in sorting, because it is logically arranged alphabetically in relation to its binary value.

Mr Stephens: I should just like to go into the merits of going to the ISO code and rejecting the TTS code. The first thing is many people have to re-equip. Secondly, the paper-to-tape costs, since wider tape will be used, will be about 20 per cent more. Thirdly, the punch device wear will be twice as great. The Murray code was based upon the frequency of characters used in the English language: 'e' punched one hole, 't' punched one, and so on, in descending order. But if we take these on the ISO code, four holes will be punched as against one in TTS. I am talking now about lower case characters. Three will be punched for the 'a' instead of two on TTS; six for the 'o' as against two on TTS. I see no merit in changing to any system which is going to put up the wear on the peripherals, and the cost of paper tape, unless there are some other advantages.

Mr Phillips: ISO was put together with the idea of zoning characters, and peripheral wear was not considered. I suspect they were thinking in terms of magnetic tape, and they were looking for a logical relationship between the characters a—1, b—2, and so on, and a zoning which enabled them to retain this for transmission. One actually has two zones which are nothing but transmission and device controls. The idea was that the code would go to seven tracks, that one could have an eighth or ninth parity if required. The computers would turn over to this, and data transmission would use this code with all the device controls that would be obtainable by extending it to seven tracks from six. These things are not available so easily on the present code. One cannot defend this on the basis of wear on peripherals. It is obvious that there is a correlation between the Baudot-Murray code and things like the Morse code, and the endeavour was to achieve exactly the same thing, in which the elements were related to the occurrence of the characters.

Dr Leonard: I understood the point of the ISO code was that there were better error correction facilities because of the extra code for the shift.

Mr Phillips: The idea of putting up a logical code in any case is to achieve this error correction. Possibly these things have not yet been brought in. They will only be available when a great deal more analysis has been done, not only on error, but on self-error corrections, in which various mistakes cannot be made, because the configuration does not allow it. One can put it right automatically. But there is not enough redundancy in the code to permit this to be very sophisticated. One would need many more bits if one was going to do this, would not one?

Dr Leonard: Is the ISO code case-dependent or not-case-dependent?

Mr Phillips: On the TTS code, the case change is attained by a shift which means a group of characters is prefaced by a code. This is a shift, and has the same effect as pressing a typewriter key, which moves one into a different position. That means that a character may have more than one meaning, but with the ISO code one adds an additional bit. From the point of view of translation, one always considers that a shift and a bit are synonymous. If one is moving into configuration with fewer channels, then the extra channel that comes out becomes a shift on the new configuration. If one is moving from a configuration of six channels to seven, then the shift becomes an extra bit on the seven channels and configuration.

Dr Leonard: From the point of view of data links, the idea of the ISO code was if one lost a single character in data transmission the next character would still know which shift it was in, whereas if one happened to lose the shift signal on the old TTS system, one would be fouled up until one got to the next correction.

Mr Phillips: That is perfectly clear, because it is more enhanced on a five-bit code when one is on figures or an alphabetical shift, and one lowers one's shift, one gets absolute gibberish. We need more channels, and if we tried to achieve economy in bit

occurrence in relation to usage, we would not have a logical relationship of characters. It is a case of which is required. I should not like to defend one or the other.

Mr Jolliffe: Quite apart from the data transmission, the ISO code is in fact frequency-independent. It does not depend on the frequency in English, which differs from the frequency in German; it does present a common language.

The Moderator: The various coding systems which exist—not only the encoding of paper tape, but of magnetic tape within computers, in various printing devices and so on—generally answer conflicting requirements. I do not expect to see any real degree of standardisation. I hope the number of varieties will tend to decrease rather than increase, but only because I get tired of having to program that many more conversions from code system to code system internally.

Clearly, in most cases one will need to have internal code conversion, as one comes into the computer, and it is just a question of how many of these one has to program. If, for instance, the wear on the punch device is an important aspect in a particular economic situation, I would expect that the coding system used would minimise this wear, whereas if one is primarily concerned with data links, or simplifying the code conversion for a particular ordering system, one would go a different way. I think these various code systems are going to continue.

Mr Phillips: Unfortunately one is using the same equipment for the same sort of thing and cannot escape from one into the other very easily.

Dr Margerison: What does it matter what code one uses? One can convert them easily enough. If one does not have a computer, one is very worried about what code should be used, because one is stuck with it and there is great difficulty in changing from one to the other. Surely we are moving into an era where it is less important to have standardisation of codes?

Mr Phillips: That is exactly what all my computer friends say, and then I say, when do I get the results of the program? They say they have not yet written the code conversion!